



## Estimation of the economic impact of temperature changes induced by a shutdown of the thermohaline circulation: An application of FUND

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### Abstract:

The integrated assessment model FUND 2.8n is applied in an assessment to estimate the magnitude of the general market and non-market impacts of temperature changes caused by a possible shutdown of the thermohaline circulation (THC). The monetized impacts of this change in environmental conditions are determined for 207 individual countries for two scenarios: one warming scenario in which the THC weakens but remains intact, and another in which the THC breaks down. Eight different response patterns are identified. The dominant pattern is that a THC shutdown has an offsetting effect on the underlying warming trend. Depending on whether the impacts of warming are initially beneficial or detrimental, the economic effects of a THC shutdown show distinct regional variability. Key economic sectors affected are water resources and energy consumption, as well as cardiovascular and respiratory diseases among health impacts. The maximum national impact of a shutdown of the THC turns out to be of the magnitude of a few per cent of GDP, but the average global impact is much smaller. The results indicate that the temperature effect of a THC shutdown does not create an insurmountable economic threat on a global scale, but may cause severe damages to individual countries. However, a consideration of other climatic impacts such as precipitation and sea level changes is likely to alter the identified trends in economic development.

**Source:** <http://dx.doi.org/10.1007/s10584-009-9796-7>

### Resource Description

#### Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Other Climate Scenario

**Other Climate Scenario:** IPCC IS92e

#### Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

#### Communication Audience:

audience to whom the resource is directed

# Climate Change and Human Health Literature Portal

Policymaker, Researcher

## **Exposure :**

weather or climate related pathway by which climate change affects health

Food/Water Security, Precipitation, Sea Level Rise, Temperature

## **Geographic Feature:**

resource focuses on specific type of geography

Ocean/Coastal

## **Geographic Location:**

resource focuses on specific location

Global or Unspecified

## **Health Co-Benefit/Co-Harm (Adaption/Mitigation):**

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

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## **Health Impact:**

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Infectious Disease, Respiratory Effect

**Infectious Disease:** Foodborne/Waterborne Disease

**Foodborne/Waterborne Disease:** General Foodborne/Waterborne Disease

## **Mitigation/Adaptation:**

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

## **Model/Methodology:**

type of model used or methodology development is a focus of resource

Cost/Economic

**Population of Concern:** A focus of content

## **Population of Concern:**

populations at particular risk or vulnerability to climate change impacts

Low Socioeconomic Status

## **Resource Type:**

format or standard characteristic of resource

Research Article

**Timescale:** ☒

time period studied

Long-Term (>50 years)

**Vulnerability/Impact Assessment:** ☒

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content